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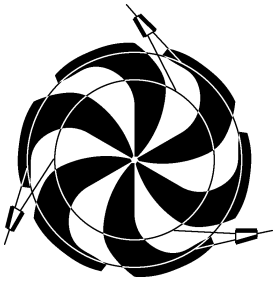

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SCIENTIFIC ACTIVITIES
1999

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CANADA'S NATIONAL LABORATORY
FOR PARTICLE AND NUCLEAR PHYSICS

OPERATED AS A JOINT VENTURE

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UNDER A CONTRIBUTION FROM THE
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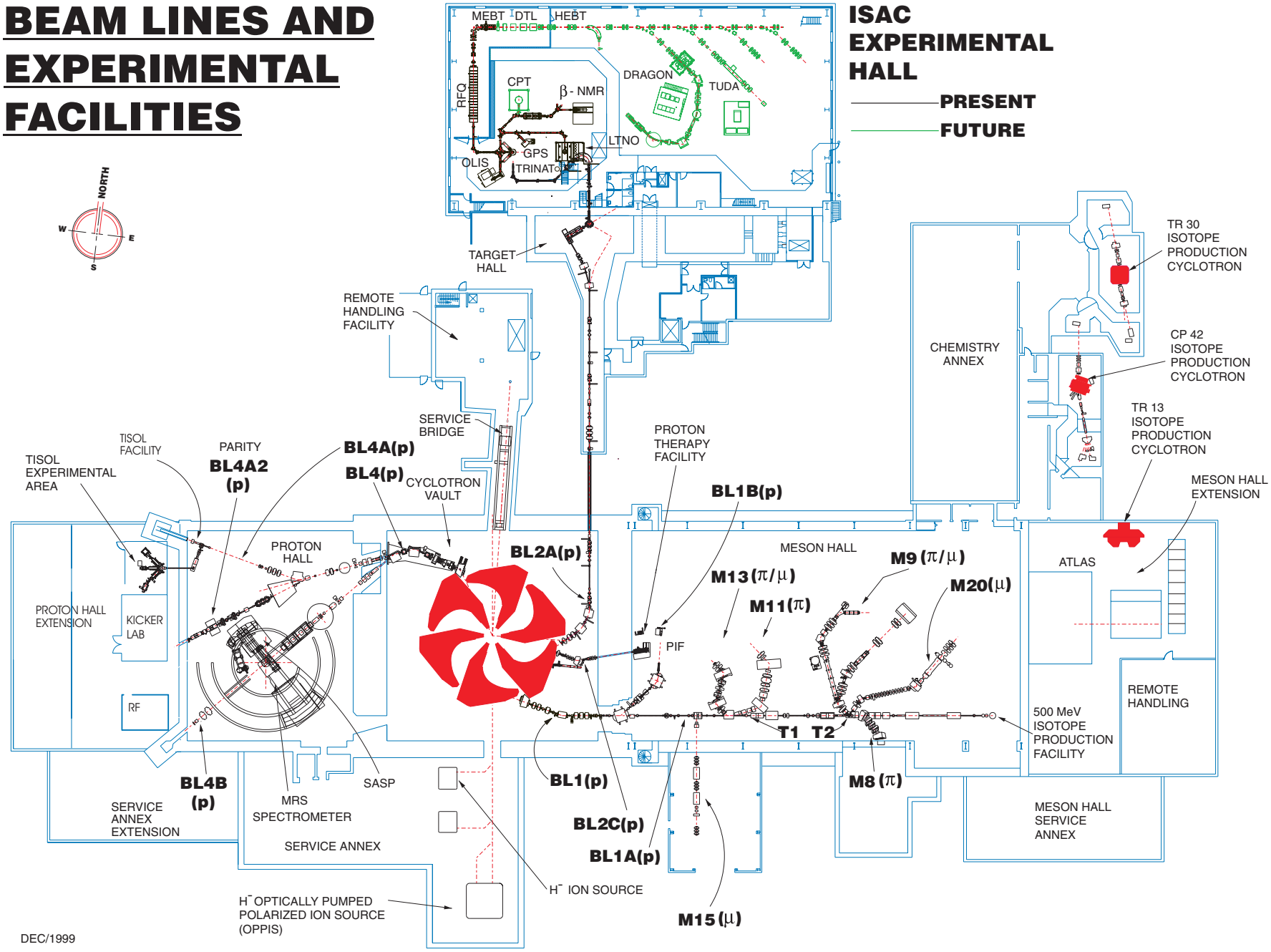


The contributions on individual experiments in this report are outlines intended to demonstrate the extent of scientific activity at TRIUMF during the past year. The outlines are not publications and often contain preliminary results not intended, or not yet ready, for publication. Material from these reports should not be reproduced or quoted without permission from the authors.

FOREWORD

1999 was a year of continuing challenge and success for TRIUMF. The laboratory's scientific proposal for the next five years, 2000–2005, received outstandingly strong support from the NRC Peer Review Committee. Their final report, published in February, recommended full funding of $43 million per year. This vote of confidence in TRIUMF's scientific program and the promise of the next five years provided a very strong platform on which to build the case to the NRC, the federal government and the provincial government for funding for 2000–2005.

As an important part of making that case, an extensive round of meetings and visits to the laboratory was conducted throughout the year for members of the federal and provincial governments, for members of the Senate and for other influential Canadians. All were enthusiastic and very positive about TRIUMF. Of particular importance was the interest in and support for TRIUMF displayed by Mr. John Manley, Minister for Industry Canada, and his Deputy Minister, Mr. Kevin Lynch.

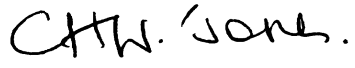
While all indications for TRIUMF's funding remained positive throughout 1999, nevertheless the inevitable element of uncertainty was always with us. It is to the credit of the TRIUMF staff that they were not distracted by this and they continued to perform in exemplary fashion through the year. This was evidenced by the remarkable and pleasing regularity with which the ISAC projects achieved major milestones, and by the other components of TRIUMF's programs which continued to enhance our reputation both across Canada and abroad. All of the TRIUMF staff are to be congratulated on the year's achievements.

During the year, the TRIUMF Board took the critically important step of extending Dr. Alan Astbury's term as Director to August 31, 2001. This recognized the very high quality of the leadership that Alan has brought to TRIUMF and ensured that his knowledge and experience would guide us through the request for our renewed funding and into the next five years. The Board also initiated the process of searching for the next Director to take office in September 2001, recognizing that the search would only begin in earnest once the funding for 2000–2005 is known.

It is also appropriate to recognize the strong support of TRIUMF by all the Full and Associate member universities and by their representatives on the Board of Management. The Board members have displayed a high level of commitment to TRIUMF and their continuing efforts on TRIUMF's behalf should be acknowledged.

I am confident that the year 2000 will bring a renewed five-year budget which will show a significant increase and that the laboratory will move forward vigorously with a dynamic program which will build on its past successes.

All members of TRIUMF can take pride in 1999 as a year of scientific, technical and administrative achievements.



C.H.W. Jones
Chair, Board of Management

TRIUMF was established in 1968 as a laboratory operated by the University of Alberta, Simon Fraser University, the University of Victoria and the University of British Columbia under a contribution agreement from the National Research Council of Canada. The initial consortium has been expanded to include Carleton University, the University of Manitoba, the Université de Montréal, Queen's University, the University of Regina and the University of Toronto as associate members. The facility is operated for all Canadian as well as foreign users.

The experimental program is based on a cyclotron which is capable of producing four simultaneous beams of protons, two of which are individually variable in energy from 180–520 MeV, the third from 472–510 MeV, and the fourth between 70 and 110 MeV. The potential for high beam currents – 100 μA at 500 MeV to 300 μA at 400 MeV – qualified this machine as a 'meson factory'. The third high intensity beam line feeds the new isotope production facility, ISAC, which started operation in 1998 and qualifies as a second generation radioactive beam facility.

Fields of research include basic science, such as particle physics, nuclear physics, nuclear astrophysics, and condensed matter research, as well as life sciences based primarily on isotope research. There is also a biomedical research facility which uses protons for treatment of ocular melanomae. TRIUMF is providing the Canadian contribution to the Large Hadron Collider at CERN and TRIUMF resources are also available to support the Canadian subatomic program at other laboratories.

The ground for the main facility, located on the UBC campus, was broken in 1970. Assembly of the cyclotron started in 1971. The machine produced its first full-energy beam in 1974 and its full current in 1977.

The laboratory employs approximately 325 staff at the main site in Vancouver and 19 based at the participating universities. The number of university scientists, graduate students and support staff associated with the present scientific program is about 625.